BY ORDER OF THE COMMANDER
341ST SPACE WING

MALMSTROM AIR FORCE BASE
INSTRUCTION 32-7001

31 MAY 1999

Civil Engineering

CONTROLLING INDUSTRIAL WASTE DISCHARGES TO SANITARY SEWERS

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

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The instruction implements AFPD 32-70, *Environmental Quality*, and AFI 32-7041, *Water Quality Compliance*. It establishes policies, assigns responsibilities, and provides criteria, standards and procedures for control of Malmstrom AFB wastewater discharge to the city of Great Falls sanitary sewer. Specifically, it prohibits some and sets limitations on other types of liquid wastes that can be discharged to the sanitary sewer system if these may be detrimental to the wastewater treatment process, the treatment plant workers, or the receiving stream. This instruction describes the collection, segregation, and pretreatment necessary to meet the regulatory restrictions. Violations of the specific prohibitions and requirements of this instruction (in para. **2.**, **4.**, and **5.**) by military personnel may result in prosecution under the Uniform Code of Military Justice (UCMJ). Violations of this instruction by Air Force civilian employees may result in appropriate disciplinary action without regard to criminal liability. It applies to all personnel assigned to the 341st Space Wing and subordinate units, and personnel assigned or attached to, or supported by, Malmstrom AFB.

SUMMARY OF REVISIONS

The revision of this publication is to meet the format standards required by Air Force. No significant content material has changed, only designation changes and the deletion of references to other Malmstrom AFB Instructions that are no longer in existence have been made. Some required format changes have been made to allow for the conversion process.

1. Policy Requirements. Federal, state, and local authorities publish regulations for collecting, pretreating, and discharging domestic and industrial wastewater into the sanitary sewer system. These regulations, along with this instruction, form the basis for establishing base requirements. Strict compliance with the current City of Great Falls Sanitary Sewer ordinance and Industrial Wastewater Discharge Permit

issued to Malmstrom AFB is critical since the City of Great Falls wastewater treatment plant is not capable of treating all types of waste produced at Malmstrom Air Force Base (MAFB). These regulations describe what limitations have been placed on the wastewater discharge from this base and what pretreatment facilities may be needed to meet these limitations. Air Force policy is to eliminate oil/water separators where possible, with new installations only recommended where required to meet compliance regulations. Installation maintenance activities should consider process changes to eliminate the perceived need for oil/water separators and floor drains where possible.

2. Organizational Responsibilities. All MAFB organizations including tenants and contractors have the responsibility to take an active role in controlling unauthorized wastewater discharges to the sanitary sewer system.

2.1. Headquarters Air Force Civil Engineering and Services Agency (HQ AFCESA). Issues policies and provides technical support to the major commands and bases.

2.2. Unit Commanders will:

2.2.1. Ensure personnel are aware of their environmental responsibility.

2.2.2. Ensure organizations under their command manage all waste products according to the applicable regulations.

2.2.3. Prohibit environmentally unacceptable wastewater discharges in the sewer system.

2.2.4. Review base plans for collection, storage, pretreatment, and disposal of waste products.

2.3. Base Civil Engineer (BCE) will:

2.3.1. Publish local operating instructions for pollution control facilities.

2.3.2. Establish recurring training programs to qualify supervisors and technicians to operate treatment facilities. Make sure all plant personnel are aware of safety requirements.

2.3.3. Maintain pretreatment facility manuals as required.

2.3.4. Maintain adequate resources for equipment, supplies, and certified operators to operate pretreatment facilities where required.

2.3.5. Maintain facility operating logs, records, and drawings.

2.3.6. Pump out full storage tanks, cleanup of oil/water separator facilities, or equipment adjustments, and repairs, etc.

2.4. Environmental Flight will:

2.4.1. Take steps to eliminate noncompliance conditions identified through self-monitoring or by appropriate regulatory agencies.

2.4.2. Submit records and reports to regulatory agencies and the MAJCOM.

2.4.3. Establish technical policy requirements for the base.

2.4.4. Provide guidance to base activities for collection, treatment, storage, and disposal of domestic and industrial wastewater.

2.4.5. Submit permit application and subsequent reports.

2.5. Bioenvironmental Services will:

2.5.1. Maintain surveillance over potential environmental contamination from MAFB facilities.

2.5.2. Assist the BCE with compliance monitoring.

2.5.3. Conduct periodic evaluations to determine if the wastewater control facilities and abatement methods are complying with applicable standards.

2.5.4. Submit copies of monitoring and evaluation reports to BCE.

2.6. User level and generating agencies that generate wastes will:

2.6.1. Ensure that generated hazardous waste products are not discharged to the sewer, but are properly collected, segregated, stored, and disposed of according to the applicable regulations.

2.6.2. Inform the Utilities Shop of needed service or maintenance.

2.6.3. Assume responsibility to maintain all building grease traps, trench drains, sand traps, etc., in good, clean working order.

3. Wastewater Types. Wastes generated at MAFB generally include, but are not limited to: fuels, oils and greases, automotive shop wastes, aircraft maintenance and repair wastes, paint strippers, aircraft washrack wastes, cleaning wastes, engine cleaning and degreasing wastes, photographic laboratory wastes, pool filters, and acid wastes. These generated wastes shall not be discharged into the base or City sanitary sewer system. Instead they shall be segregated, collected, stored when required, and disposed of by approved methods.

4. Discharge Regulations. The following regulations set limitations on liquid wastes discharged to the sanitary sewer system. Refer to the current City of Great Falls Sanitary Sewer Ordinance-Chapter 13.20-*Sewer System--Regulations, Article II, General Discharge Prohibitions,* regarding wastewater discharge to the sanitary sewer system, and *Article VIII, Administration of Industrial Wastewater Discharges*. Also refer to the City of Great Falls, "Permit to Discharge Industrial Wastewater" for Malmstrom Air Force Base and the City of Great Falls Ordinance No. 2551 regarding sewer system rules and regulations. All of these regulations set restrictions on the wastewater discharged from the base into the sanitary sewer system. Any additions or updates to these regulations are to be considered part of this plan for compliance purposes. To view the above, contact the Environmental Flight.

5. Collection.

5.1. Air Force base wastes may contain high amounts of solvents, sludge, oils, grease, fuels and other petroleum products, acids, alkalis, etc. These wastes should not be discharged into the sanitary sewer system and in turn to the City of Great Falls wastewater treatment plant. Dispose of these wastes through the Environmental Flight. Refer to the *Malmstrom Air Force Base Hazardous Waste Management Plan* for proper handling of these products. Do not discharge any wastes that can cause a fire danger, explosion, or damage to the sewer pipe. Some wastes can be pretreated and discharged to the sanitary sewer, although pretreatment may not be cost effective depending on the amount of waste generated and the capital and operating costs for the pretreatment facilities.

5.2. Dumping toxic wastes, hazardous wastes, or petroleum on the ground is strictly prohibited. Organizations generating waste products shall process all wastes in accordance with the Hazardous Waste Management Plan.

5.3. Food processing grease collected from grease traps or collected directly from cooking units such as french fry cooking units, shall be stored outside each food service facility in a grease container. MAFB provides a contract service for collection of this waste grease material. Do not discharge the waste grease down the sanitary sewer or with the garbage.

6. Segregation.

6.1. Organizations generating wastes shall segregate all the waste produced. Careful collection and segregation of all waste products will decrease the disposal costs and reduce the threat of environmental pollution. Do not mix noncompatible waste products in one container for disposal. The generator shall segregate waste fuels by type. Store JP-4, MOGAS, diesel, etc., in separate Department of Transportation approved 55 gallon drums. Store waste oils such as engine and gear case oils, excluding all synthetic types in the same container. Store waste products such as synthetic engine oil, hydraulic fluids, solvents, anti-freeze, greases, sludges, separately in steel drums or containers. Always store acids and alkalis separately in plastic drum containers.

6.2. Segregating waste products and storing the material in separate drums is extremely important because of the disposal requirements of these products. Drums containing unknown mixed liquids require testing to determine the contents. Laboratory costs are very high, particularly when testing an unknown material. Used synthetic engine oils command a high resale value, and it is very important to segregate these products from other petroleum products because of possible lead contamination.

7. Disposal. Contact the Environmental Flight for assistance and disposal requirements. Markings on containers and drums shall meet the requirements of T.O. 42B-1-23 for waste liquid petroleum products and the Resource Conservation and Recovery Act (RCRA) for hazardous waste materials.

8. Methods of Handling Specific Types of Wastewater. Certain types of wastes produced at MAFB must be pretreated or controlled prior to discharge to the sanitary sewer system. The following require proper handling prior to discharge from the base.

8.1. Flammable Liquids. Examples of flammable liquids include motor vehicle gasoline (mogas), jet fuel, lube oil, fuel oil, kerosene, benzene, naphtha, and mineral oil. Leaks, spills, or discharges of these liquids into the sewer system can collect in pump station wet wells, pipelines, and collection and treatment facilities. This condition can result in development of an explosive atmosphere and a safety hazard. Areas containing these types of flammable liquids should be dried up by pumping or by using absorbent materials as applicable. Dispose of properly.

8.2. Oil and Grease. Domestic wastewater treatment plants are not designed to remove large amounts of oil and grease. Oil and grease should be removed from the waste, containerized, and disposed of properly. Contact the Environmental Flight for disposal of the containerized material.

8.3. Settleable Solids. Settleable solids can build up and block the sewer. The solids may then break down in the pipes and form hydrogen sulfide and methane gas. Wastewater with a high amount of settleable solids may overload the treatment capacity of the plant. Do not discharge any waste containing more than 0.5% settleable solids. Solids material should be containerized. Contact the Environmental Flight for disposal of the containerized material.

8.4. Acids and Alkalis. Acids and alkalis can corrode pipes and kill the stabilizing bacteria in a biological treatment plant. Sulfate salts (even at a neutral pH) may corrode parts of the system when the

sulfate is reduced to sulfide and then oxidized to form sulfuric acid. Containerize the material and contact the Environmental Flight for disposal.

8.5. Heavy Metals. Heavy metals such as chromium, cadmium, and mercury are toxic to biological treatment units and biological life in receiving waters. These metals can also hurt the quality of drinking water intakes downstream of the treatment plant. This would include all the towns and cities below Great Falls using the Missouri River for drinking water. Containerize the material and contact the Environmental Flight for disposal.

8.6. Toxic Gases. Toxic gases such as hydrogen sulfide, methane, and hydrogen cyanide, are often present or may form in industrial wastewater. Hydrogen sulfide and methane also form in domestic wastewater. Wastewater with high amounts of sulfides can cause problems in anaerobic digesters in wastewater treatment plants because they can form hydrogen sulfide. Cyanide compounds may react with acids to form hydrogen cyanide, a highly toxic and deadly gas. Containerize these materials and contact the Environmental Flight for disposal.

8.7. Organic Toxins. Pesticides and other very toxic substances should not be discharged to a treatment plant. Even though in small quantities they may not damage the biological life in the wastewater treatment plant, organic toxins can still damage the receiving water. Containerize this material and contact the Environmental Flight for disposal.

9. Methods of Handling Specific Types of Waste Products. Waste products generated at Malmstrom are collected in drum containers and disposed by the Environmental Flight. Residual domestic greases and petroleum hydrocarbons in wastewater adversely affect treatment plants. Grease traps and oil-water separators are installed at key points on the base to handle these products. In order for these pretreatment facilities to function effectively, they have to be operated and maintained on a regular basis.

9.1. Oil/Water Separators:

9.1.1. Gravity oil/water separators must be operated properly or the liquid discharged from the separator could contaminate the sanitary sewer or open ditch. Proper operation of oil/water separators includes the following:

9.1.1.1. Oil/water separators are designed to capture and separate residual oils and fuel from drains and wash rack facilities, or to capture accidental spills. They are not to be used for collecting or holding pure waste fuel or oil products.

9.1.1.2. The introduction of any substance into an oil/water separator must be through the conduit or pipeline designed for that purpose, never through the inspection manway, vent pipe, or other opening at the top of the separator.

9.1.1.3. Discharge of water or oil/water mixtures into an oil/water separator must not exceed the separator flow rate or storage capacity.

9.1.1.4. Nothing shall be discharged into an oil/water separator after the oil/fuel storage capacity has been reached.

9.1.1.5. The environmental impact and potential for serious fire or explosion is obvious. Cigarette smoking and open flames are prohibited within 50 feet of the separator facilities.

9.1.2. Gravity separation of mixtures of oil/fuel and water depends on the difference in specific gravity of oil/fuel and water. Oil and fuel rise to the surface and heavy solids settle to the bottom.

Oil skimmings and sludges are removed from time to time. Separators must be checked often, depending on the volume and nature of wastes, to ensure that baffles and skimmers are properly placed and working right. Oil holding tanks must be checked on a regular schedule to prevent an overflow of waste oil from getting into the sanitary sewer. Buildups of oil should be pumped off on a regular schedule. Oil emulsions (mixtures of oil and water) cannot be removed by gravity separation alone and require chemical or other treatment.

9.1.3. The ability of oil/water separators to function properly depends upon the application of required routine service and maintenance. Some wastewaters require more than gravity separation. These wastes may have to be segregated with provisions for adequate pretreatment prior to introducing them into the domestic wastewater system. The following minimum criteria shall be adhered to for oil/water separators and pretreatment of industrial wastewater.

9.1.3.1. Personnel responsible for managing oil/water separators must be qualified. The Utilities Shop is responsible for maintenance of all oil/water separators. These personnel should be familiar with all appropriate federal, state, and local regulations pertaining to separators.

9.1.3.2. A base map with all units clearly marked shall be maintained within the Utilities Shop. In addition, they shall maintain maps, diagrams, construction layouts, and detailed information on all separators and holding tanks. Oil/water separator units should be inspected on a regular schedule, as determined by usage, and observed data recorded. Inspection of the oil/water separators is the responsibility of the Utilities Shop. Each facility manager shall notify the Utility Shop if he or she determines that the oil/water separator or storage tank requires maintenance or pumping. The inspection done by the Utilities Shop should include:

9.1.3.2.1. Check effluent chamber to ensure no free oils, fuels, or greases, are being passed to the effluent. Record findings.

9.1.3.2.2. Check the rotary skim pipe to ensure the open slot of the pipe is set slightly higher than the maximum water level. Adjust if necessary and record.

9.1.3.2.3. Observe the accumulation of sludge in all the chambers. Record the depth of sludge.

9.1.3.2.4. Check the oil collection chamber or separate storage tanks to see if oil removal is needed. Record level.

9.1.3.2.5. Observe all valves, piping, and pumps associated with the separator systems for adjustments, breaks, leaks, or obstructions. Record findings.

9.1.3.2.6. Prior to disposing of any liquid waste from a separator facility, the waste should be lab tested if it is suspected of containing hazardous waste. All sampling and testing shall be done by Bioenvironmental Services. Refer to 40 CFR 403, *General Pretreatment Regulations for Existing and New Sources of Pollution, Appendix B, Toxic Pollutants,* and 40 CFR 261, *Identification and Listing of Hazardous Waste,* for sampling and testing requirements.

9.1.3.3. A maintenance schedule to service oil/water separators for oil/grease and sludge removal will be based on actual observed needs.

9.1.3.4. Sludge shall be removed when the sludge volume in the separator equals 20 percent of the holding capacity. To allow further accumulation will significantly reduce the unit's effi-

ciency. The Utilities Shop shall provide for evacuation of waste material and cleaning of these facilities as required.

9.1.3.5. The correct water level shall be maintained in oil/water separators at all times. When a unit has been serviced (cleaned out), it must be refilled with water to the proper level. The static water level shall be maintained within 1 to 2 inches of the oil skimming device or such that the water level nears the overflow condition of the effluent chamber.

9.1.4. It is necessary that all personnel are aware of the importance of good operation and maintenance of these units and that poor management will result in noncompliance with environmental regulations and in subsequent penalties and fines.

9.2. Grease Traps:

9.2.1. The term "grease" includes the fats, oils, and waxes found in wastewater. These wastes often come from kitchen cleaning and vehicle storage and maintenance operations. If discharged in large amounts, they may cling to the walls of collection systems and treatment plant structures and form scum in clarifiers. In extreme cases, they may coat the slime of trickling filters or flocs of activated sludge plants and slow the oxygen transfer. Most fatty-type substances degrade very slowly and may build up to a thickness of many feet in sludge digesters. Fats and greases put down the sink accumulate in the sewage system and cause blockages, especially in cold weather. Even when running hot water down the sink, the fats congeal and coagulate as soon as they hit the cold section of the pipe, sometimes just a few feet away from the building.

9.2.1.1. Grease traps shall be used on all food services facilities at Malmstrom Air Force Base to retain the grease before the waste is discharged to the sanitary sewer. No grease shall be discharged directly to the building sewer from any food service without first going through a grease trap. Waste grease from cooking units such as french fry units shall be drained into separate containers and stored in fly-tight containers located outside the building for separate collection. A contract service is used at MAFB for separate collection of this waste grease.

9.2.1.2. Home occupants on base also need to handle grease waste properly. Household fats and greases shall be dumped into sealed containers such as plastic bottles, after cooling, or cans with sealed lids. These containers can then be placed into the garbage can along with the regular household garbage. This does not apply to food service wastes. Cooking grease should never be discharged down the sink, toilet, or any drain as a means of disposal.

9.2.2. The manager of each facility is responsible for frequent cleaning of their grease traps in order to prevent grease buildup and washout to the sanitary sewer. All grease traps should be frequently inspected to determine maintenance requirements. MAFB is required to meet an oil and grease maximum contaminant level of 100 milligrams per liter (mg/l). Domestic grease waste must be handled properly in order that this regulatory level can be met on a continuing basis.

9.3. Other Methods of Pretreatment.

9.3.1. At this time, it is not cost effective to provide pretreatment facilities for other industrial type wastes generated at MAFB. The current practice is to place other regulated wastes in approved drum containers and dispose of them through the Environmental Flight. Refer to the following publications for recommended methods to be used for pretreatment of varying type wastes: Riojas, A.H. & R.D. Binovi. *Designed Criteria for Process Wastewater Pretreatment Facilities,* USAFOEHL Report 88-069EQ0111E1B.

9.3.2. Refer to **Attachment 2**, *Effects of Some Contaminants on Wastewater Treatment Facilities,* for remedial action recommended for different types of waste products.

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Commander

Attachment 1

GLOSSARY OF ABBREVIATIONS AND ACRONYMS

Abbreviations and Acronyms

AFPD—Air Force Policy Directive

AFI—Air Force Instruction

BCE—Base Civil Engineer

DRMO—Defense Reutilization & Marketing Office

MAFB—Malmstrom Air Force Base

MAFBI—Malmstrom Air Force Base Instruction

MAJCOM—Major Command

mg/l—milligrams per liter

MOGAS—motor vehicle gasoline

RCRA—Resource Conservation and Recovery Act

TO—Technical Order

UCMJ—Uniform Code of Military Justice

Attachment 2

EFFECTS OF SOME CONTAMINANTS ON WASTEWATER TREATMENT FACILITIES

WASTE CHARACTERISTIC	PROBLEMS CAUSED IN SEWER SYSTEMS	REMEDIAL ACTION	PROBLEMS CAUSEDIN TREATMENT	REMEDIAL ACTION
Oil, grease and fat	Coating and clogging; reduction in sewer capacity as result of grease buildup	Pretreatment, sewer cleaning	Interferes with biological activity in both trickling filter and activated sludge plants. Excessive scum, inhibits digestion.	Gravity oil separation, dissolved air flotation
Acidity	Corrosion and disintegration of concrete and steel pipe	Neutralization, equalization	Corrosion of pumps and other plant equipment and structures upset biological organisms	Neutralization
Alkalinity	Corrosion of metal pipe, possible scaling	Neutralization, equalization	Reduced efficiency of activated sludge; possible unloading of trickling filters; disruption of the digestion process	Neutralization
Grit	Excessive wear on pump stations; accumulations may clog piping	Pretreatment, sewer cleaning	Overload municipal grit chambers; adds to sludge volumes; clogs pipes in settling tank; difficult to remove accumulations from digesters; reduces digester capacity	Installation of additional grit removing facilities
Coarse suspended matter	Obstruction of piping	Pretreatment utilizing screen and grit removal; cleaning of sewers	Overloads municipal treatment equipment	Frequent cleaning of screens and other preliminary treatment units

WASTE CHARAC-TERISTIC	PROBLEMS CAUSED IN SEWER SYSTEMS	REMEDIAL ACTION	PROBLEMS CAUSEDIN TREATMENT	REMEDIAL ACTION
Heavy metals and toxic substances	In the presence of excess acidity or alkalinity, may produce poisonous gases	Pretreatment	Inhibits or upsets biological processes; heavy metals may accumulate in the sludge causing additional sludge disposal problems	Identification; increase monitoring action pretreatment using chemical addition
Excessive organic loading	May create septic conditions in sewer lines resulting in the production of hydrogen sulfide gas, which corrodes concrete structures and is also lethal	Pretreatment; try to maintain aerobic conditions in sewer system; prechlorinate in lift stations	Creates excess organic load on treatment plant; reduces dissolved oxygen concentrations in the activated sludge process; produces ponding and anaerobic conditions on trickling filters	Prechlorination; increase capacity of aeration equipment; control pH
Flammable and explosive substances	Fires/explosions; noxious vapors, create safety hazards for sewer maintenance personnel	Prevent discharge into sewer; monitoring; use of safety equipment	Fires, explosions; may inhibit or destroy biological organisms	Monitoring of influent